Claims

1. Sensor device for detecting an external impact load on a vehicle (12), in particular in the case of a pedestrian impact, with at least one sensor line (14) responsive to a mechanical deformation, a carrier body (16) receiving the sensor line (14), and a measuring unit (20) cooperating with the sensor line (14) for providing an impact signal, wherein the carrier body (16) includes a deformation structure (18) in engagement with the sensor line (14) for segment-wise variable pressure force transmission.

2. Sensor device according to Claim 1, thereby characterized, that the deformation structure (18) influences the signal transmission in the sensor line (14) in the case of an impact.

3. Sensor device according to Claim 1 or 2, thereby characterized, that the pressure force transmission is adaptable to the impact resistance of the surrounding vehicle part (32) via adaptation means (26; 44, 46) provided along the length of the sensor line (14).

4. Sensor device according to one of Claims 1 through 3, thereby characterized, that the pressure force transmission is so adapted, that the impact signal in the case of a predetermined impact load remains constant independent of the point of impact.

5. Sensor device according to one of Claims 1 through 4, thereby characterized, that the deformation structure (18) includes a

number of force transmission elements (26) distributed along the sensor line (14) in uneven separation from each other.

6. Sensor device according to one of Claims 1 through 5, thereby characterized, that the carrier body (16) exhibits an irregular changeable bending resistance or stiffness along the sensor line (14) as a result of changes in the cross section or in the material density or as a result of breakthroughs or recesses or the like as adaptation means.

7. Sensor device according to one of Claims 1 through 6, thereby characterized, that the carrier body (16) includes an elastically deformable spacer (14, 16) with elasticity varying along the sensor line (14).

8. Sensor device according to one of Claims 1 through 7, thereby characterized, that the carrier body (16) includes at least one longitudinal bar (44, 46), bendable or buckling under transverse load, running along the sensor line (14).

9. Sensor device according to Claim 8, thereby characterized, that the longitudinal bar (44, 46) includes a variable wall thickening or wall weakening for adaptation of its transverse stiffness.

10. Sensor device according to one of Claims 1 through 9, thereby characterized, that the deformation structure (18) acts upon the sensor line (14) upon exposure to local bending forces.

11. Sensor device according to one of Claims 1 through 10, thereby characterized, that multiple sensor lines (14) are provided next to each other.

12. Sensor device according to one of Claims 1 through 11, thereby characterized, that multiple sensor lines (L1-L5) include active segments (54) in engagement with the deformation structure (18) and blind segments (56) not in engagement.

13. Sensor device according to Claim 12, thereby characterized, that the length of the segments (54, 56) varies for different sensor lines (14).

14. Sensor device according to Claim 12 or 13, thereby characterized, that the length of the active and blind segments (54, 56) for each row (L1-L5) of sensor lines (14) decreases at a fixed ratio.

15. Sensor device according to one of Claims 1 through 14, thereby characterized, that the deformation structure (18) includes two comb-like deformation bodies (22, 24), and that the sensor line (14) runs between the deformation bodies (22, 24) which engage in each other upon impact.

16. Sensor device according to one of Claims 1 through 15, thereby characterized, that the sensor line includes at least one optical fiber (14).

17. Sensor device according to one of Claims 1 through 16, thereby characterized, that the sensor line (14) includes two

conductor or guide segments (14', 14") running side by side and continuously connected, preferably via a loop.

18. Process for detecting an external impact load on a vehicle (12), in particular in the case of a pedestrian impact, wherein an impact signal is produced by a sensor line (14) responsive to a mechanical deformation, wherein the force transmission on the sensor line (14) is locally varied by a deformation structure (18), so that the impact signal in the case of a predetermined impact load remains the same independent of the impact point.

19. Process according to Claim 18, thereby characterized, that light is introduced into an optical fiber (14) of a sensor device (10) and that the light transmissivity in the optical fibers (14) is influenced by changes in the radius of bends bend, and that a signal change of the light signal derived from the optical fiber is evaluated as impact signal.